

## CLAIMS

What is claimed is:

- 1        1. An extended wear chain comprising:
  - 2            a chain component; and
  - 3            a coating on said component including one or more of zirconium, titanium, a zirconium compound, and a titanium compound.
- 1        2. The extended wear chain of claim 1, wherein said coating forms  
2        a metallurgical bond with said component.
- 1        3. The extended wear chain of claim 2, wherein said metallurgical  
2        bond is formed by said coating being at least slightly implanted into a surface  
3        of said component.
- 1        4. The extended wear chain of claim 1, wherein said chain is  
2        adapted for cutting a substance.
- 1        5. The extended wear chain of claim 1, wherein said coating  
2        includes zirconium nitride.
- 1        6. The extended wear chain of claim 1, wherein said coating  
2        includes titanium nitride.
- 1        7. The extended wear chain of claim 1, wherein said coating forms  
2        a layer on said component less than or equal to 12 microns thick.
- 1        8. The extended wear chain of claim 1, wherein said chain  
2        component is a cutter.
- 1        9. An extended wear chain comprising:

2           a chain component; and  
3           a coating on said component including one of zirconium nitride and  
4           titanium nitride.

1           10.   The extended wear chain of claim 1, wherein said coating forms  
2       a metallurgical bond with said component.

1           11.   The extended wear chain of claim 10, wherein said metallurgical  
2       bond is formed by said coating being at least slightly implanted into a surface  
3       of said component.

1           12.   The extended wear chain of claim 1, wherein said chain is  
2       adapted for cutting a substance.

1           13.   The extended wear chain of claim 1, wherein said chain  
2       component is a cutter.

1           14.   A chainsaw chain comprising:  
2           a plurality of cutters;  
3           means for connecting said plurality of cutters; and  
4           a coating on each of said plurality of cutters including one or more of  
5           zirconium, titanium, a zirconium compound, and a titanium  
6           compound.

1           15.   The chain of claim 14, wherein said coating forms a  
2       metallurgical bond with said cutter.

1           16.   The chain of claim 15, wherein said metallurgical bond is formed  
2       by said coating being at least slightly implanted into a surface of said cutter.

3           17.   The chain of claim 14, wherein said means for connecting said  
4       plurality of cutters is coated with one or more of zirconium, titanium, a  
5       zirconium compound, and a titanium compound.

6           18. The chain of claim 17, wherein said means for connecting said  
7 plurality of cutters is one or more of a tie strap, a pre-set tie strap, a drive link,  
8 and a depth gage.

1           19. A chainsaw comprising:  
2           an extended wear chain including:  
3            a chain component; and  
4            a coating on said component having one or more of zirconium,  
5            titanium, a zirconium compound, and a titanium  
6            compound.

1           20. The chainsaw of claim 19, wherein said coating forms a  
2 metallurgical bond with said component.

1           21. The chainsaw of claim 20, wherein said metallurgical bond is  
2 formed by said coating being at least slightly implanted into a surface of said  
3 component.

1           22. The chainsaw of claim 19, wherein said component is a cutter,  
2 and further wherein a plurality of cutters are combined with a plurality of  
3 means for connecting said plurality of cutters to form said chain.

1           23. The chainsaw of claim 19, wherein said coating includes  
2 zirconium nitride.

1           24. The coated chain of claim 19, wherein said coating includes  
2 titanium nitride.

1           25. A method for making an extended wear chain comprising the  
2 steps of:  
3            producing a chain or a chain component; and  
4            coating said chain or chain component with one or more of zirconium,  
5            titanium, a zirconium compound, and a titanium compound.

1           26. The method of claim 25, wherein said coating is accomplished  
2 using a vacuum deposition process.

1           27. The method of claim 26, wherein said vacuum deposition  
2 process is a physical vapor deposition process.

1           28. The method of claim 27, wherein said physical vapor deposition  
2 process is one of an ion plating, an electron beam gun, a thermal evaporation,  
3 a sputtering, a laser ablation, and a cathodic arc process.

1           29. The method of claim 27, wherein said physical vapor deposition  
2 process is an ion plating process.

1           30. A method for making an extended wear chain comprising the  
2 steps of:

3           placing a chain or a chain component into a vacuum chamber; and  
4           coating said chain or chain component with a wear-extending  
5           substance by using a vacuum deposition process.

1           31. The method of claim 30, wherein said vacuum deposition  
2 process is a physical vapor deposition process.

3           32. The method of claim 31, wherein said physical vapor deposition  
4 process is one of an ion plating, an electron beam gun, a thermal evaporation,  
5 a sputtering, a laser ablation, and a cathodic arc process.

1           33. The method of claim 31, wherein said physical vapor deposition  
2 process is an ion plating process.

3           34. The method of claim 30, wherein said wear-extending substance  
4 is one of zirconium, titanium, a zirconium compound, and a titanium  
5 compound.

1           35. The method of claim 30, wherein said wear-extending substance  
2 is one or both of zirconium nitride and titanium nitride.

1           36. A method for making an extended wear chainsaw chain  
2 comprising the steps of:  
3           placing a chain cutter into a vacuum chamber; and  
4           depositing a layer of one or both of titanium nitride and zirconium  
5           nitride on a surface of said cutter by using a physical vapor  
6           deposition process, wherein a metallurgical bond is formed  
7           between said surface of said cutter and said one or both of  
8           titanium nitride and zirconium nitride.

1           37. The method of claim 36, wherein said metallurgical bond is  
2 formed by said coating being at least slightly implanted into said surface of  
3 said component by said physical vapor deposition process.

1           38. The method of claim 36, wherein said physical vapor deposition  
2 process is an ion plating process.

1           39. A method for making an extended wear chainsaw chain  
2 comprising the steps of:  
3           stamping a plurality of chain components from a raw material;  
4           placing some portion of said plurality of chain components into a  
5           vacuum chamber; and  
6           depositing a layer of one of titanium nitride and zirconium nitride onto  
7           surfaces of said some portion of said plurality of chain  
8           components by using a physical vapor deposition process,  
9           wherein a metallurgical bond is formed between said surfaces  
10           and said one of titanium nitride and zirconium nitride.

1           40. The method of claim 39, wherein said metallurgical bond is  
2 formed by said coating being at least slightly implanted into said surfaces by

3 said physical vapor deposition process.

1           41. The method of claim 39, wherein said physical vapor deposition  
2 process is an ion plating process.

1           42. The method of claim 39, wherein at least one of said some  
2 portion of said plurality of chain components undergoing said depositing step  
3 is a cutter.

1           43 The method of claim 39, further comprising the step of  
2 assembling said plurality of chain components into a closed-loop chain for use  
3 in a chainsaw.